

## REMARKS

The Examiner's attention to the present application is noted with appreciation.

### 35 U.S.C. § 112

In Section 3 of the Office Action of July 12, 2007, the Examiner rejected claims 1-25, 27 and 33-47 under 35 U.S.C. § 112 ¶ 2 as being indefinite for failing to particularly point out and distinctly claim the subject matter which Applicant regards as the invention. In Section 4 of the Office Action, the Examiner states that it is not clear if claim 1 requires that two separate seed layers be formed. The Examiner additionally states that the function of the step of seeding the substrate is not clear. Applicant directs the Examiner's attention to page 13 of the specification, lines 2-4, which recite: "Under proper process conditions some of the deposits completely cover the surface (e.g. Au on Ni). The seed layer is deposited and the deposition component continues to plate and build up, growing from the original seed site." Thus, the seed may or may not entirely cover the substrate. If the seed does entirely cover the substrate, then the deposition component will form a second layer. If the seed does not entirely cover the substrate, then the deposition component will form a second layer in some areas, and will not form a second layer in other areas.

Claim 1 is based upon the specification, and thus neither requires nor precludes requiring that two separate seed layers be formed. The Examiner asks if the seed composition in some manner influences the depositing of the deposition composition. Applicant directs the Examiner's attention to page 12 of the specification, lines 7-8, which recites: "For electroless deposition processes the seed layer acts as catalytic surface allowing the metal/ion to reduce on those sites." Thus, the seed composition does in some manner influence the depositing of the deposition composition.

In Section 5 of the Office Action, the Examiner states that it is not apparent what other materials are included in claim 1 or how it would be determined whether the material is more or less noble than the substrate. Those metals, metal alloys, or metal-containing compounds not recited in claim 2 are recited by Applicant in claim 1. The Examiner is directed to any comprehensive chemistry reference text or website, such as [http://www.corrosionsource.com/handbook/galv\\_series.htm](http://www.corrosionsource.com/handbook/galv_series.htm), to determine where specific materials are located in the galvanic series.

In Section 6 of the Office Action, the Examiner states that claim 6, line 1 lacks antecedent basis for "the barrier layer." Applicant has amended claim 6 to recite: "The method of claim 1 wherein the barrier layer comprises at least one material selected from the group consisting of a metal nitride, a metal silicate, a metal combination and a non-metal combination," and has amended claim 1 to recite: "A method of forming a deposit on a substrate with a barrier layer comprising the steps of: providing a polarizing, poorly electrical conducting organic solution with a desired deposition component; providing a deposition substrate; treating a barrier layer; seeding the deposition substrate with a seed composition comprising a more noble composition than a less noble deposition substrate; and depositing the desired deposition component from the polarizing, poorly electrical conducting organic solution onto the substrate to form a seed composition or film."

In Section 7 of the Office Action, the Examiner states that it is not apparent what the composition in claim 9 is less noble than. Applicant has amended claim 9 to recite: "The method of claim 8 wherein the deposition substrate comprises at least one composition selected from the group consisting of tungsten-based, tantalum-based, titanium-based and any other compositions less noble than the more noble seed compositions."

In Section 8 of the Office Action, the Examiner states that it is not apparent how adding a compound to a solution treats the substrate. Applicant directs the Examiner's attention to page 17 of the specification, lines 20-24, which recite: "A particularly useful pre-treatment method utilizes a  $\text{HBF}_4$  solution to both potentially clean and/or remove inhibitive species, such as oxides. It is preferred that  $\text{HBF}_4$  (or other halogenated pre-treatment solutions), such as but not limited to fluorosilic acid, HF, sodium fluoride or any other halogen solutions be used."

In Section 9 of the Office Action, the Examiner states that claim 17, line 1 lacks antecedent basis for "non-halogenating compound." Applicant has amended claim 17 to recite: "The method of claim 16 wherein the halogenated compound comprises at least one member selected from the group consisting of  $\text{HBF}_4$ , HF, NaF,  $\text{H}_2\text{SiF}_6$ , and HCl." and amended claim 16 to recite: "The method of claim 15 wherein the treating step comprises introducing a halogenated compound into the organic solution."

In Section 10 of the Office Action, the Examiner states that it is not clear what the galvanic coating

is simultaneous with and separate from. Applicant directs Examiner's attention to page 8 of the specification, lines 23-24: "The deposition occurs using two galvanic half-cell reactions. Simultaneous or separate galvanic coating may be used," and page 18 of the specification, lines 2-3: "Two process variations can be used to carry out the galvanic reactions and are referred to as simultaneous or separate coating as illustrated in Fig. 3."

In Section 11 of the Office Action, the Examiner states that in claim 45, it is not clear what the pressure is elevated relative to. Applicant has cancelled claims 40, 41, 43, and 45.

37 CFR 1.75(c)

In Section 12 of the Office Action, the Examiner objected to claims 7, 8, and 35 under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant has cancelled claims 7, 8, and 35.

35 U.S.C. § 102(b)

In Section 14 of the Office Action, the Examiner rejected claims 1-9, 13, 15-18, 20-24, and 35-37 under 35 U.S.C. § 102(b) as being anticipated by Miura et al. (5,302,256). Applicant has amended claim 1 to recite: "A method of forming a deposit on a substrate with a barrier layer comprising the steps of: providing a polarizing, poorly electrical conducting organic solution with a desired deposition component; providing a deposition substrate; treating a barrier layer; seeding the deposition substrate with a seed composition comprising a more noble composition than a less noble deposition substrate; and depositing the desired deposition component from the polarizing, poorly electrical conducting organic solution onto the substrate to form a seed composition or film."

Additionally, Applicant has added dependent claim 48 to recite: "The method of claim 1 wherein the polarizing, poorly electrical conducting organic solution comprises less than 5% water by volume" and Applicant has added dependent claim 49 to recite: "The method of claim 1 wherein the polarizing, poorly electrical conducting organic solution comprises most preferably less than 0.25% by volume." Miura et al. does not teach an organic solution. Miura teaches a plating bath that contains organic acids. Therefore,

since claims 2-9 depend on amended claim 1, Applicant believes claims 2-6 and 8-9 are allowable. Claim 7 has been cancelled.

Applicant's amended claim 13 recites: "The method of claim 1 wherein the polarizing, poorly electrical conducting organic solution comprises at least two deposition components." Applicant believes claim 13 is now allowable.

Applicant's amended claim 16 recites: "The method of claim 15 wherein the treating step comprises introducing a halogenated and non-halogenated compound into the non-ionic conducting organic solution." Claim 15 is dependant on claim 1 and claim 17 is dependant on claim 16. Thus, Applicant believes claims 15-17 are now allowable.

Applicant has cancelled claims 20-24. Applicant has amended claim 25 to recite: "The method of claim 1 wherein the polarizing, poorly electrical conducting organic solution comprises at least one member selected from the group consisting of a two-phase solution and a single-phase solution." Therefore, Applicant believes claim 25 is allowable.

Applicant has cancelled claims 35-38. Dependent claims 39-47 relate back to amended claim 1. Therefore, Applicant believes claims 39, 42, 44, and 46-47 are allowable. Claims 40-41, 43, and 45 have been cancelled.

35 U.S.C. § 103(a)

In Section 18 of the Office Action, the Examiner notes that the application currently names joint inventors. Applicant is obligated under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made. Applicant respectfully informs the Examiner that all claims are jointly owned by both inventors.

In Section 19 of the Office Action, the Examiner rejected claims 10 and 14 under 35 U.S.C. § 103(a) as being unpatentable over Miura et al. (5,302,256) in view of Zhao et al. (5,660,706). That rejection is traversed. As noted previously, claim 1 has been amended to recite: "A method of forming a deposit on a substrate with a barrier layer comprising the steps of: providing a polarizing, poorly electrical conducting organic solution with a desired deposition component; providing a deposition substrate; treating a barrier layer; seeding the deposition substrate with a seed composition comprising a more noble

composition than a less noble deposition substrate; and depositing the desired deposition component from the polarizing, poorly electrical conducting organic solution onto the substrate to form a seed composition or film."

Zhao et al. teach positive copper ions in the solution (abstract) and Miura et al. teach an organic acid in an aqueous solution. Neither Zhao et al. nor Miura et al. teach a non-ionic conducting organic solution. Therefore, Applicant believes claims 10 and 14 are allowable.

In Section 21 of the Office Action, the Examiner rejected claims 12 and 19 under 35 U.S.C. § 103(a) as being unpatentable over Miura et al. (5,302,256) in view of the Lowenheim text *Modern Electroplating*. Applicant recites a method of forming a deposit by providing a non-ionic conducting organic solution. Neither Miura et al. nor Lowenheim teach a non-ionic conducting organic solution. Dependent claims 12 and 19 are thus believed to be allowable.

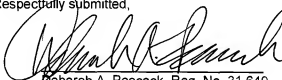
In Section 23 of the Office Action, the Examiner rejected claim 27 under 35 U.S.C. § 103(a) as being unpatentable over Miura et al. (5,302,256) in view of Stouffer et al. (US 2004/0249023). Applicant has amended claim 27 to recite: The method of claim 1 wherein the polarizing, poorly electrical conducting organic solution comprises a cation exchange reactant. Dependent claim 27 is thus believed to be allowable.

There is no reasonable expectation of success in creating the present invention by combining the patents and articles cited by the Examiner. The present invention is a method of forming a deposit on a substrate from a non-ionic conducting organic solution with a desired deposition component. None of the references cited by the Examiner teach an organic solution. A reasonable expectation of success must be found in the prior art and not based on Applicant's disclosure; Applicant asserts that this is not the case here. "A patent composed of several elements is not proved obvious merely by demonstrating that each element was, independently, known in the prior art." *KSR Intern. Co. v. Teleflex Inc.*, 127 S.Ct. 1727 U.S., 2007. "Anticipation is not made out by culling from one and another of the prior patents elements of the combinations in suit, where the combinations themselves are not shown in the prior patents." *U.S. Filter Corp. v. Ionics, Inc.*, 68 F.Supp.2d 48, D.Mass., 1999.

If any issues remain, or if the Examiner believes that prosecution of this application might be expedited by discussion of the issues, the Examiner is cordially invited to telephone the undersigned attorney for Applicant at the telephone number listed below.

Please charge any additional fees or credit overpayment to Deposit Account No. 13-4213.

Respectfully submitted,

A handwritten signature in black ink, appearing to read 'Deborah A. Peacock', written over a horizontal line.

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Date: October 10, 2007

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